



Innovative Self-Reports Of Health-Related Quality Of Life In Basic Training:

Their Measurement And Meaning For Attrition.

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**INNOVATIVE SELF-REPORTS OF HEALTH-RELATED QUALITY OF LIFE IN
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ATTRITION.**

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Abstract

Costly attrition in and immediately following basic training is a fact of military life. Its concomitant factors and the means to identify personnel at risk are now available. Extensive development of health-related quality of life (HRQOL) measures for the chronic diseases of asthma, gastric complaints and hypertension identified a generalisable three factor model of HRQOL measurement. This model was found to account for common variance among patient self-reports validated against clinical trial data. *The three HRQOL domains were emotional, physical and social (daily living activities) correlating to produce a higher-order general factor of HRQOL.* This model was implemented in the construction and validation of a self-report inventory for US Air Force inductees at Lackland Air Force Base during 1997 to 1999, when 1500 recruit respondents provided data that was coordinated with a wide spectrum of cognitive, personality and interest measures. .

Internal consistencies for the domains were high. Results show that after six weeks of basic training there were substantial numbers at risk for attrition. In terms of convergent and discriminant validity, the correlates of HRQOL were substantial with certain Big Five Inventory measures, and smaller but consistent with cognitive assessments. Use of the HRQOL inventory identifies recruits for whom supportive counselling could reduce the risk of attrition or serve to place them on 'attrition watch' during their next assignment.

Attrition and Quality of Life

The drop-out rates of US military recruits during basic training for 2002 show the Army and Navy lose 14% of recruits, the Marine Corps 12% and the Air Force 7%. Most recruits leave for physical reasons, including injuries: but many have previously undisclosed physical or mental ailments, as well as performance-related difficulties. The cost of recruiting new service members exceeds \$10,000 per person, while the cost of initial entry training is estimated at \$35,000 on average. Instrumentation to provide forewarning of attrition risk, even among survivors, is an aid to recruit management, as well as being cost-beneficial. The

In the most recent report of factors likely to affect attrition in the USAF, Baumgarten (2004) analysed two unobtrusive measures of risk, use of social support services and use of mental health services. For social support, significant predictors of asking for help from the service were degrees of family instability, co-worker conflict, community integration and supervisor support. High family instability and high co-worker conflict emerged as the strongest risk factors for requiring mental health services. Additional risk factors included being female, being enlisted, and being first-term personnel. In seeking to contribute keys to understanding the nature of HRQOL in recruit contexts, and to estimate the potential of its contribution to lessening attrition, four essential sources underpin this study. Three (Schneider, 1947 Trent & Laurence, 1993, Irvine, 1995), reveal that self esteem arising from job satisfaction in basic training is a powerful intervening variable in recruit retention.

Table 1: Do's and Dont's in Basic Training

Advice to Potential Recruit	Knowledge Required
Start getting into shape before you leave. Boot camp is physically intensive. Work especially on running and pushups.	Fitness
If you know someone who's been in the military, ask him/her to teach you some simple marching and facing movements.	Procedural, Physical
Memorize your particular service's rank structure (both officer and enlisted) before you leave.	Declarative
Inform your family and friends that it's very important that they write often. Boot camp can be very lonely.	Procedural
Practice making your bed with "hospital corners."	Procedural
Don't arrive "standing out in the crowd." Cut your hair short, and wear conservative clothes. You don't want the D.I.s to remember you.	Procedural
Bring ONLY what is on the list. Anything extra will be confiscated and will give the D.I. an excuse to chew you out.	Declarative and Procedural
Go in with the right attitude. Remember, EVERYONE messes up in boot camp, and EVERYONE gets chewed out. The "real military" won't be this way.	Declarative
Never, ever, make excuses.	Procedural
Do exactly what you're told to do, when you're told to do it, and how you're told to do it. Don't be inventive.	Procedural
When speaking to a D.I., always stand at rigid attention, eyes locked forward.	Procedural
Don't volunteer. You're much better off in boot camp if the D.I. hardly remembers your name. Those who are "remembered" often get "special attention."	Procedural
If you're "on time," then you're late. Always be where you're supposed to be five minutes early.	Procedural

There is a widespread belief that recruits are destabilized by loss of self-esteem associated with adverse physical and degrading social experiences (called 'beasting' see *Daily Express* September 19, 2000). To demonstrate the commonly held views of what life is like for US recruits, the list of do's and don'ts was downloaded from a website giving information to potential applicants. *The list serves two purposes: first as a layman's guide to operating in a total 24/7 command environment; second as an indication of how much of learning in recruit climates is procedural, rather than declarative.* Procedural knowledge, knowing how, is everywhere. Knowing that, or declarative knowledge, is seldom to be found. This means that a great many procedures will have to be mastered. Not much in one's previous background can be used as a preparation for life at boot camp, and not much apart from working memory capability predicts individual differences in the speed of acquiring procedural knowledge (Kyllonen, 1996; Kyllonen & Christal, 1989).

Acquiring complex procedural behaviours imposes stress on the system. Moreover, one may correctly infer from the list that performance models in military contexts are not one-dimensional (Campbell, McCloy, Oppler & Sager 1992). We propose to specify the dimensions of basic training performance models more precisely. An essential part of that specification includes health-related quality of life as a moderator of performance.

The concept of Health-Related Quality of Life (HRQOL) in medical science is a relatively recent addition to outcome accountability whose potency is well understood, particularly by pharmacological companies. A search for the exact phrase 'health-related quality of life' in a popular search engine will produce over 4 hundred thousand references. Although empiricism is universal, theory is perhaps less well formulated; and like all theories for relatively new concepts, subject to debate. The development of theory for measuring Health-Related Quality of Life by the present author took place over a period of seven years while investigating HRQOL among chronic diseases involving separate groups of asthma, gastric and hypertensive patients (Bamfi, Olivieri, Arpinelli, De Carli, Recchia, Gandolfi, Norberto, Pacini, Surrenti, Irvine, & Apolone, 1999; De Carli, Irvine, Arpinelli, Bamfi, Olivieri, & Recchia G.1. 1995, 1998; Irvine, Hyland, Wright, Recchia, Del Negro, & De. Carli, 1992; Irvine, Wright, Recchia, De Carli, & Zanferrari, 1993; Irvine, Wright, De Carli, & Recchia, 1994). Extensive analysis of protocols led to the identification of key domains in the formulation of self-reported patient QOL,

regardless of the chronic disease studied. General feelings of wellbeing or malaise were functions of three domains – *emotional states, physical activities and social interactions*. These domains were always positively correlated and provided a causal framework for the production of a general factor.

If the theory were to transfer to the state of HRQOL brought about by recruit training conditions, then Health-Related Quality of Life in basic training should be identified through and measured reliably by items describing the three domains. This study relates the successful application of health-related quality of life theory to the construction of a simple self-report inventory that identifies recruits at risk. Construction, standardisation and validation are based on the results of 1512 voluntary USAF recruits at Lackland Air Force Base, in 1999 during their last week of basic training. There were 999 male and 513 female respondents. For construct validation, a large reference frame of independent measures was available¹

The Inventory Scales: Descriptives and Reliabilities.

Table 2 lists the items for the three scales, descriptive statistics and internal consistency estimated using Cronbach's alpha coefficient. The draft inventory of items was produced by discussion with USAF personnel about aspects of recruit training and from direct observation of recruit and Drill Instructor behaviour. The scales themselves were constructed after first factoring all the items in the draft form, using maximum likelihood factoring and extracting three factors. Following Varimax and Promax rotations, the items with the highest loadings on the factors were subjected to scale reliability analysis.

The three factor-determined scales are used as measures of HRQOL for the sample of 1512 USAF recruits. Inspection of the items in Table 2 permits verification of the three domains.

Each scale reaches a satisfactory level of internal consistency. Distributions approached normality and proved to be capable of further definition by using the extensive array of context variables in regression analyses.

¹ Information Processing Capability (Tests for Selection and Interviews: T_SI), Motivational Profiles (The Self-Inventory: S_I), Job Activity Preferences (Jobs and Occupations Inventory: JOIN), Biological Adaptation to Night and Day Situations: (Circadian Propensities BANDS), Health-Related Quality of Life in the Workplace (Military Version): (HRQoL_W).. Other measures included all US Air Force ASVAB results, gender and ethnic status.

Table 2: Three factor referenced scales of Health-Related Quality of Life² in basic training

Emotional QOL Scale	Physical QOL Scale	Social QOL Scale
Felt discouraged or downhearted?	Felt threatened (picked on) by people in the flight?	Wanted privacy, but couldn't have any?
Worried about your ability to succeed?	Found some PT exercises too hard to do?	Been Sleeping Badly?
Worried about things that might happen?	Been blamed for letting the flight down?	Found that living in dorms makes you feel uncomfortable?
Been afraid that you wouldn't pass the course?	Been breathless during PT activities?	Had your sleep disturbed?
Worried more than most people?	Had problems walking 300 yards quickly?	Deliberately avoided someone in the flight?
Felt tense?	Had difficult day-to-day relationships in the flight?	Taken a personal dislike to person(s) in the flight?
Had panicky feelings?	Had trouble marching in step with the flight?	Lost your temper?
Become mentally exhausted (tired like never before)?	Forgotten where you put things?	Been restricted in your social life?
Wanted to quit because life was not what you expected?	Been made fun of by people in the flight?	Been aware that sharing facilities can make life difficult?
Been unable to think straight?	Forgotten a drill movement?	Had headaches?
Felt like not doing anything anymore?	Not been able to remember things?	
Been hassled by the pace of life around you?	Had problems climbing flights of stairs?	
Complained to your family about what was happening to you?		
Wanted to go home to be with your own friends?		
Needed more time to think?		
Mean 44.0 N 1512.0 Std. Dev. 14.3	Mean 23.5 N 1512.0 Std. Dev. 7.2	Mean 32.8 N 1512.0 Std. Dev. 8.1
Cronbach's Alpha .911	Cronbach's Alpha .793	Cronbach's Alpha .761

By isolating items that loaded on all three factors, an attempt was made to construct a short scale of General Coping Skills in recruit training. This is included as Table 3.

Table 3: General Basic Training Coping Skills Scale

Short General Coping Skills Scale
Felt confident, sure of yourself?
Been accepted by others in the flight?
Increased your self-respect?
Remained in good spirits (active, outgoing, upbeat)?
Physically felt strong?
Coped with new people easily?
Felt happy?
Done parade ground drills correctly?
Coped with service demands?
Been able to keep pace with the workload?
Mean 47.2 N 1512.0 Std. Dev. 7.0 Cronbach's Alpha .803

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The correlations of the four scales are reported in Table 4 together with their loadings on a general Health-Related Quality of Life factor.

Table 4: Scale intercorrelations and general factor loadings

	EmotionalQ0L	PhysicalQ0L	SocialQ0L	Coping Skills	Factor
EmotionalQ0L	1	.659	.651	.558	.862
PhysicalQ0L	.659	1	.558	.582	.788
SocialQ0L	.651	.558	1	.385	.717
Coping Skills	.558	.582	.385	1	.653
N	1512	1512	1512	1512	1512

Extraction Method: Maximum Likelihood. 1 factors extracted. 4 iterations required.

The General Coping Skills Scale was also subjected to microanalysis by regression using non-cognitive measures. It was possible to predict the coping skills scale scores ($R = .679$) using the scores from the three independent HRQOL factors, the score on Interest in Military Service, morning tendency, sex/gender and age. *Basic training coping skills were accompanied by good Health-Related Quality of Life, greater interest in Military Service, preferring to be active in the morning, being male and being older on entry.*

Validation Outcomes

Validation from the sample and data characteristics consisted of group comparisons and construct validation by microanalysis of the scale scores using the extensive array of psychometric data available for regression analyses. The large sample size permits inclusive and detailed stepwise regression.

Validation by Category

Validation by category assumes, from previous research findings, that there are significant differences in HRQOL during recruit training associated with gender. In general, women find service life more difficult to cope with than men and they have proportionately less success in their careers. Baumgarten's (2004) work on use of support services confirms this generally accepted outcome; and one would predict a poorer HRQOL in basic training for women than men.

Table 5 below shows the results of group comparisons translated into the three domains and coping skills.

Table 5: Male and female HRQOL differences and effect sizes

Sex	EmotionalQ0L	PhysicalQ0L	SocialQ0L	Coping Skills
Female	45.2	24.5	34.5	46.7
Male	43.4	22.9	31.9	47.4
F Ratio	5.7	17.9	34.6	3.4
p	.017	.000	.000	.063
Total	44.0	23.5	32.8	47.2
N	1512.0	1512.0	1512.0	1512.0
Std. Dev,	14.3	7.2	8.1	7.0
Male v. Female	0.12	0.22	0.32	0.10
Effect Size				

Higher scores in the scales are associated with poorer HRQOL. Female recruits show a consistent trend to a less satisfactory QOL in all three domains and in the coping skills scale, although not all group means are significantly different from each other. Significance with such a large sample size is not important in operational terms. There are only two effect sizes worthy of attention, Physical and Social, the latter being the more pronounced, showing a one-third standard deviation difference. In short, the physical demands and social climate of basic training are more salient in female perceptions of aspects of life at this particular time in their military careers.

Participants declared their affiliation with one of the ethnic groups used by the authorities for records purposes. When these were used to reveal the extent of variations, the results of Table 6 were not such that would indicate the need for special care and attention to groups.

Table 6: Ethnic identity HRQOL differences and effect sizes

Population Group	EmotionalQ0L	PhysicalQ0L	SocialQ0L	WellbeingQ0L
American Indian	45.8	22.7	33.4	46.2
Asian	45.4	23.7	30.5	47.1
Black	42.4	23.1	33.7	47.9
Hispanic	42.6	22.5	30.8	48.2
White	44.6	23.7	32.9	46.8
Other	43.2	23.4	34.3	48.2
Total	44.0	23.5	32.8	47.2
F Ratio	1.48	0.90	3.65	2.23
p	.192	.480	.003	.049
Total Means	44.0	23.5	32.8	47.2
N	1512.0	1512.0	1512.0	1512.0
Std. Deviation	14.3	7.2	8.1	7.0
High v. Low	0.23	0.16	0.46	0.24
Effect Size				

The largest effect size of 0.46 standard deviation units separating the best and worst social quality of life perceptions contrasts Asian and Hispanic (best), and Black and Other (worst). However, these are extremely small differences compared with those who wanted to quit the service and those who did not. In Table 7 the average scale results are shown for the categories *Wanted to quit because life was not what you expected* on a six interval scale from Always to Never. The effect sizes are sizeable and dramatic, with pronounced linear trends

Table 7: HRQOL differences by wanting to quit categories

Quit Category	Emotional QOL	Physical QOL	Social QOL	Coping Skills
Always	74.3	32.9	42.4	39.8
Usually	65.4	29.1	38.9	42.0
Often	58.7	27.8	37.3	42.3
Sometimes	52.5	26.6	36.3	43.7
Rarely	45.2	24.2	32.7	46.2
Never	36.8	21.0	30.8	49.6
High v. Low Effect Size	2.62	1.65	1.43	1.40

Finally, the scales were subjected to microanalysis by regression and their definition by association with other variables in the array was determined.

Table 8 provides the key to understanding the nature of the scales when they are defined by other measures. The consistent appearance of the personality scales and the patterns created by the interest and cognitive scales show that there are pervasive influences on recruit performance and capability to cope with the stresses of induction programmes. Emotional stability is the key, followed by attention to rules, self confidence and no overwhelming desire to affiliate with and care for others. Interest in active, outdoor and military environments can be contrasted with lack of interest in business and indoor occupations. In the cognitive area, there are advantages associated with good working memory and perceptual speed. These qualities are important in the acquisition of procedural knowledge (Kyllonen, 20

Table 8: Microanalyses of HRQOL scales by regression

Independent Predictors	HRQOL Emot	HRQOL Physical	HRQOL Social	Coping Skills
TSR Reactive Scale Total	High	High	High	High
TSR Proactive Scale Total	High	High	Low	High
TSR Nurturant Scale Total	Low	High	High	High
TSR Interactive Scale Total	Low		Low	High
TSR Equable Scale Total	Stable	Stable	Stable	Stable
TSR Cognitive Scale		Low		
Rdr Sleep Debt	Low Debt		Low Debt	Low Debt
Rdr Morning Style		High	High	High
JOIN Physical Environment	High		High	High
JOIN Business Group		Low		Low
ASVAB: Coding Speed(CS)		High		High
ASVAB Electrical Info		Low		
ASVAB Mech. Comp.		High	High	
ASVAB Word Knowledge		Low	Low	
Error Detection Score				High
Word Rules Score	High	High	High	
Multiple Correlations	R=.719	R=.634	R=.558	R=.691
% Variance	52	40	31	48

Discussion and Conclusions

Total command environments on a 24/7 schedule, with little or no counter control on those who issue the orders, are not easy to master by anyone (Irvine, 1995). They are least accommodating to young people; and particularly to those whose life-styles may be laissez-faire. Exposure to the rite of passage demands of basic training may induce the most common of ego-defence mechanisms in these circumstances: giving up (flight) or resistance (fight) or acquiescence. In any case, coping skills will be needed to survive without leaving the armed services during or soon after the experience.

Clearly, those whose emotional stability may be challenged are most likely to find the climate of total command destabilising. The close association with a desire to leave the service and the HRQOL measures is an index of its sensitivity and capacity to identify recruits under strain. Additionally, the relationship between the Emotional QOL scale and the *Irvine Self Inventory* measure of nervous disposition (Equable Scale), and the pattern of motivational, interest and cognitive correlates with all HRQOL scales support the conclusion that screening for characteristics in the recruit population that are non-

cognitive will predict attrition risk. By informed judgements about inclusion and exclusion, costs to governments on terms of money spent and to individuals in terms of stress and illness will be reduced.

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